

**DEPARTMNET OF SCIENCE AND HUMANITIES**

**INTERNAL ASSESSMENT EXAM-I**

**MA3251-STATISTICS AND NUMERICAL METHODS**

**Year/Sem: I/II ECE A & CSE A**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Q. No** |  | **BT** | **MARK** | | **CO’s** |
| **UNIT-III PART - A** | | | | | |
| 1 | **State the condition for convergence of Newton-Raphson method and order of convergence.** | L3 | 2 | | CO3 |
| 2 | **If g(x) is continuous in [a,b] then under what condition of the iterative method x=g(x) has unique** | L3 | 2 | | CO3 |
| 3 | **Find all the Eigen values of by Jacobi metho** | L3 | 2 | | CO3 |
| 4 | Evaluate using Newton’s Raphson formula. | L3 | 2 | | CO3 |
| 5 | **Find the newton-Raphson formula to find , where N is a positive number.** | L3 | 2 | | CO3 |
| 6 | Find by power method the largest Eigen value of   correct to two decimal places choose as the initial Eigen vector. | L3 | 2 | | CO3 |
| 7 | Solve the following system of equations by Gauss-Jordan method | L3 | 2 | | CO3 |
| 8 | **What sufficient for convergence of an iterative method for f(x)=0 written as x=g(x).** | L3 | 2 | | CO3 |
| 9 | **What is the order of convergence of N- R method if the multiplicity of the root is one.** | L3 | 2 | | CO3 |
| 10 | **When should we not use N.R method ?** | L3 | 2 | | CO3 |
| 11 | **What is the rate of convergence in N.R method ?** | L3 | 2 | | CO3 |
| 12 | **Find the interval in which a real root of the equation** | L3 | 2 | | CO3 |
| 13 | **Write the disadvantage of Jacobi method.** | L3 | 2 | | CO3 |
| 14 | Using Jacobi method find the Eigen values of the matrix | L3 | 2 | | CO3 |
| 15 | **Verify the following system of equations is diagonally dominant or not.** | L3 | 2 | | CO3 |
| 16 | **What is the need for pivoting in Gauss elimination method** | L3 | 2 | | CO3 |
| 17 | **Find the interval in which a real root of the equation**  **lies.** | L3 | 2 | | CO3 |
| 18 | **State the advantage of Gauss Seidel method over Gauss Jacobi method while solving system of** | L3 | 2 | | CO3 |
| 19 | **What is the difference between Gauss Jacobi’s method and Gauss-Seidel method?** | L3 | 2 | | CO3 |
| 20 | **Solve 5x-3y=8; 3x+y=2 by Gauss-Jordan method** | L3 | 2 | | CO3 |
| 21 | Find the Eigenvalue and Eigenvector of the following matrices using Jacobi method . | L3 | 2 | | CO3 |
| 22 | **Write down the procedure to find the numerically Eigen value of a matrix by power method?** |  |  | |  |
| 23 | **41.When do we use the power method?** | L3 | 2 | | CO3 |
| 24 | **What type of Eigen value can be obtained using power method?** | L3 | 2 | | CO3 |
| 25 | **Find the dominant Eigen value of** | L3 | 2 | | CO3 |
| 26 | **Explain power method of finding the Eigen value of the matrix.** | L3 | 2 | | CO3 |
| 27 | **What type if Eigen value can be obtained using power method.** | L3 | 2 | | CO3 |
| 28 | **Define Eigen value and Eigen vector.** | L3 | 2 | | CO3 |
| 29 | **What type if Eigen vector can be obtained using power method.** | L3 | 2 | | CO3 |
| 30 | **Check the conditions for convergence of the equation**  **,,** | L3 | 2 | | CO3 |
| 31 | **Write down the procedure to find the numerically smallest Eigen value of power method.** | L3 | 2 | | CO3 |
| 32 | **Write a sufficient condition for Gauss-Seidel method to converge?** | L3 | 2 | | CO3 |
| 33 | **State the order of convergence and convergence condition for N.R method ?** | L3 | 2 | | CO3 |
| 34 | **Give two direct methods to solve a system of linear equations?** | L3 | 2 | | CO3 |
| 35 | **For solving a linear system ,compute Gaussian elimination method and Gauss Jordan method?** | L3 | 2 | | CO3 |
| 36 | **State the principle used in Gauss Jordan method?** | L3 | 2 | | CO3 |
| 37 | **Write the sufficient condition for Gauss-Seidel method to be converge?** | L3 | 2 | | CO3 |
| 38 | **28.StaState a sufficient condition for gauss-Jacobi method to be converge?** | L3 | 2 | | CO3 |
| 39 | **Give two indirect methods to solve a system of linear equations?** | L3 | 2 | | CO3 |
| 40 | **State any two direct method.** | L3 | 2 | | CO3 |
| 41 | Distinguish between direct and indirect method of solving simultaneous equations | L3 | 2 | | CO3 |
| 42 | **Is the iteration method, a self-correcting method always?** | L3 | 2 | | CO3 |
| 43 | **Distinguish between direct and iterative methods of solving simultaneous equations?** | L3 | 2 | | CO3 |
| 44 | **Define Gauss Seidal method of iteration.** | L3 | 2 | | CO3 |
| 45 | **Why gauss Seidal method is a better method than Jacobi iteration method?** |  |  | |  |
| 46 | Using Newton’s method find the root between 0 and 1 of  correct to two decimal places. | L3 | 2 | | CO3 |
| 47 | **Find the power method the largest Eigen value of correct to two decimal places ,chase as the initial eigen value vector.** | L3 | 2 | | CO3 |
| 48 | **Determine the largest eigenvalue & the corresponding Eigen vector of the matrix correct to 2 decimal places using power method.** | L3 | 2 | | CO3 |
| 49 | **How will you find the smallest Eigen value of a square matrix A?** | L3 | 2 | | CO3 |
| 50 | **Find all the Eigen values of by Jacobi method** | L3 | 2 | | CO3 |
| **UNIT-III PART - B** | | | | | |
| 1 | Find the real root of the equation   by fixed point iteration method. | L3 | | 8 | CO3 |
| 2 | **Apply Gauss- Jordan method to solve the equation** | L3 | 8 | | CO3 |
| 3 | **Find by Newton’s method, the real root of the equation**  **correct to 2 decimal places.** | L3 | 8 | | CO3 |
| 4 | Find a root of by N.R method correct to three decimal places. |  |  | |  |
| 5 | Find the iterative formula for finding the value of where N is a real number, using Newton-Raphson method | L3 | 8 | | CO3 |
| 6 | Solve the following linear system of equations by Gauss elimination method | L3 | 8 | | CO3 |
| 6 | Solve the following equations by Gauss – Elimination method: 3x +4 y+5z =18; 2x-y+8z=13; 5x -2y +7z =20 | L3 | 8 | | CO3 |
| 7 | **Apply Gauss-elimination method to solve** | L3 | 8 | | CO3 |
| 8 | **Use power methods to find the dominant Eigen value and Eigen vector of the**  **matrix with** | L3 | 8 | | CO3 |
| 9 | Use Gauss-Seidel iterative method to obtain the solution of 28x + 4y − z = 32; x + 3y + 10z = 24; 2x + 17y + 4z = 35 | L3 | 8 | | CO3 |
| 10 | **Using power method find the largest Eigen value and the corresponding Eigen vector of the Matrix.**  **Take as the initial eigenvector.** | L3 | 8 | | CO3 |
| 11 | Find the dominant Eigen value and the corresponding Eigen vector of . Find also the least latent root and hence third Eigen value also. | L3 | 8 | | CO3 |
| 12 | Find the Eigen values and Eigen vectors of   using Jacobi method | L3 | 8 | | CO3 |
| 13 | Find the dominant Eigen value and the corresponding Eigen vector by power method for the matrix | L3 | 8 | | CO3 |
| 14 | Using Jacobi method, find all the Eigen values and the Eigen vectors of the matrix | L3 | 8 | | CO3 |
| 15 | Find a real root of the equation   correct to 3 decimal places by fixed point iteration method | L3 | 8 | | CO3 |
| 16 | Obtain Newton’s iterative formula for finding where N is a positive real number. Hence evaluate | L3 | 8 | | CO3 |
| 17 | Find the real root of the equation by fixed point iteration method. | L3 | 8 | | CO3 |
| 18 | Using Newton’s method find the root between 0 and 1 of correct to two decimal places. | L3 | 8 | | CO3 |
| 19 | Solve the following linear system of equations by Gauss-Elimination method  2 | L3 | 8 | | CO3 |
| 20 | **Find the numerically largest Eigen value of A=** **And the corresponding Eigen vector by power method.** | L3 | 8 | | CO3 |
| 21 | **Find the +ve root of *x*4-*x*-10=0 correct to three decimal places using Newton Raphson Method** | L3 | 8 | | CO3 |
| 22 | **Apply Gauss elimination method to solve the equation 10x-2y+3z=23,2x+10y-5z=-33,3x-4y+4z=41** | L3 | 8 | | CO3 |
| 23 | **Solve by Gauss Seidel method x-2y =-3, 2x+25y = 15 correct to four decimal places** | L3 | 8 | | CO3 |
| 24 | **Find the inverse ofby Gauss –Jordan method** | L3 | 8 | | CO3 |
| 25 | Using Jacobi method, find all the Eigen values and the Eigen vectors of the matrix | L3 | 8 | | CO3 |
|  | **UNIT-IV PART - A** |  |  | |  |
| 1 | Is the iteration method a self-correcting method always. | L4 | 2 | | CO4 |
| 2 | What is the assumption we make when Lagrange’s formula is used | L4 | 2 | | CO4 |
| 3 | **Apply Trapezoidal method to evaluate , taking h=0.2** | L4 | 2 | | CO4 |
| 4 | **State Simpson rule three eighth rule?** | L4 | 2 | | CO4 |
| 5 | What advantage has Lagrange’s formula over Newton? | L4 | 2 | | CO4 |
| 6 | State Lagrange’s interpolation formula. | L4 | 2 | | CO4 |
| 7 | What is the error in Newton’s forward interpolation formula. | L4 | 2 | | CO4 |
| 8 | Solve the system of equations using Gauss-Jordan method 2x+y=3, x-2y= -1. | L4 | 2 | | CO4 |
| 9 | What advantage has Lagrange’s formula over Newton? | L4 | 2 | | CO4 |
| 10 | What do you mean by interpolation? | L4 | 2 | | CO4 |
| 11 | What is Lagrange’s formula to find y, if three sets of values (,), (, and () are given. | L4 | 2 | | CO4 |
| 12 | What is the disadvantage in practice in applying Lagrange’s interpolation formula. | L4 | 2 | | CO4 |
| 13 | Find the second degree polynomial through the points (0,2), (2,1), (1,0). | L4 | 2 | | CO4 |
| 14 | When will use Newton’s forward interpolation formula. | L4 | 2 | | CO4 |
| 15 | Find the polynomial which takes the following values given using the Newton’s interpolating formula | L4 | 2 | | CO4 |
| 16 | Using Lagrange’s formula find the polynomial to the given data:   |  |  |  |  | | --- | --- | --- | --- | | X | 0 | 1 | 3 | | Y | 5 | 6 | 50 | | L4 | 2 | | CO4 |
| 17 | Given find the linear interpolating polynomial using Lagrange interpolation.   |  |  |  | | --- | --- | --- | | X | 2 | 2.5 | | Y | 5 | 5.5 | | L4 | 2 | | CO4 |
| 18 | Give the Newton’s divided difference interpolation formula. | L4 | 2 | | CO4 |
| 19 | Find the divided difference of for the arguments | L4 | 2 | | CO4 |
| 20 | State Newton’s formula to find f’(x) & f’’(x) using the forward differences | L4 | 2 | | CO4 |
| 21 | Find the second divided difference with arguments . | L4 | 2 | | CO4 |
| 22 | Show that . | L4 | 2 | | CO4 |
| 23 | If using divided difference table. | L4 | 2 | | CO4 |
| 24 | Write down Newton’s Backward interpolation formula. | L4 | 2 | | CO4 |
| 25 | Derive Newton’s backward difference formula by using operator method. | L4 | 2 | | CO4 |
| 26 | Derive Newton’s forward difference formula by using operator method. | L4 | 2 | | CO4 |
| 27 | When will we use Newton’s forward interpolation formula? | L4 | 2 | | CO4 |
| 28 | State Newton’s Backward difference interpolation formula. | L4 | 2 | | CO4 |
| 29 | State Gregory-Newton forward difference interpolation formula. | L4 | 2 | | CO4 |
| 30 | Find the second degree polynomial through the points (0,1), (2,3), (4,0). | L4 | 2 | | CO4 |
| 31 | What is the error in Newton’s forward interpolation formula? | L4 | 2 | | CO4 |
| 32 | State the Newton forward formula for the first and second derivatives at up-to the fourth order difference term. | L4 | 2 | | CO4 |
| 33 | Using Newton’s backward difference formula, write the formulae for the first and second order derivatives at the end values upto the fourth order difference term. | L4 | 2 | | CO4 |
| 34 | What is inverse interpolation. | L4 | 2 | | CO4 |
| 35 | Using forward difference the formula for . | L4 | 2 | | CO4 |
| 36 | Write the formula for  at using forward difference operator. | L4 | 2 | | CO4 |
| 37 | Interpret geometrically Trapezoidal rule. | L4 | 2 | | CO4 |
| 38 | Evaluate by trapezoidal rule with h=0.2. | L4 | 2 | | CO4 |
| 39 | State the local error term in Simpson’s 1/3rd rule? | L4 | 2 | | CO4 |
| 40 | State any two properties of divided differences. | L4 | 2 | | CO4 |
| 41 | Evaluate by trapezoidal rule with h=0.2. Hence evaluate approximate value of . | L4 | 2 | | CO4 |
| 42 | State the Trapezoidal rule to evaluate | L4 | 2 | | CO4 |
| 43 | Use Trapezoidal rule evaluate | L4 | 2 | | CO4 |
| 44 | Evaluate by trapezoidal rule with h=0.2. Hence evaluate approximate value of . | L4 | 2 | | CO4 |
| 45 | When does Simpson’s rule give exact result? | L4 | 2 | | CO4 |
| 46 | What is the order of error in Simpson’s 1/3rd rule? | L4 | 2 | | CO4 |
| 47 | State the local error term in Trapezoidal rule? | L4 | 2 | | CO4 |
| 48 | Find at x=1 from the following table.   |  |  |  |  |  | | --- | --- | --- | --- | --- | | X | 1 | 2 | 3 | 4 | | Y | 1 | 8 | 27 | 64 | | L4 | 2 | | CO4 |
| 49 | State Simpson’s one-third rule. | L4 | 2 | | CO4 |
| 50 | State Simpson’s three-eighth rule? | L4 | 2 | | CO4 |
|  | **UNIT-IV PART - B** |  |  | |  |
| 1 | Fit a Lagrangian Interpolating polynomial   |  |  |  |  |  | | --- | --- | --- | --- | --- | | X | 0 | 1 | 2 | 5 | | Y=f(x) | 2 | 3 | 12 | 147 | | L5 | 8 | | CO4 |
| 2 | Using Lagrange’s interpolation formula, calculate the profit in the year 2000 from the following table.   |  |  |  |  |  | | --- | --- | --- | --- | --- | | Year | 1997 | 1999 | 2001 | 2002 | | Profit in lakhs of Rs. | 43 | 65 | 159 | 248 | | L5 | 8 | | CO4 |
| 3 | If find a polynomial that satisfies this data using Newton’s divided difference interpolation formula. Hence find f(6). | L5 | 8 | | CO4 |
| 4 | From the following table, find f(6) using Newton’s divided difference formula   |  |  |  |  |  | | --- | --- | --- | --- | --- | | X | 1 | 2 | 7 | 8 | | Y | 1 | 5 | 5 | 4 | | L5 | 8 | | CO4 |
| 5 | Find y(10) and y(5)=12,y(6)=13,y(9)=14and y(11)=16 by Lagrange’s formula . | L5 | 8 | | CO4 |
| 6 | Using Newton’s forward interpolation formula find the polynomial f(x) satisfying the following data. Hence find the value of f(2).   |  |  |  |  |  | | --- | --- | --- | --- | --- | | X | 0 | 5 | 10 | 15 | | Y | 14 | 379 | 1444 | 3584 | | L5 | 8 | | CO4 |
| 7 | Use Newton’s divided difference formula to find f(5), from the following data   |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | | X | 0 | 2 | 3 | 4 | 7 | | Y | 4 | 26 | 58 | 112 | 466 | | L5 | 8 | | CO4 |
|  |  |  |  | |  |
| 8 | Find given   |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | | X | 0 | 1 | 2 | 3 | 4 | | y(x) | 1 | 1 | 15 | 40 | 85 |   Hence find at x=0.5 | L5 | 8 | | CO4 |
| 9 | By dividing the range into ten equal parts, evaluate  by Simpson’s rule. Verify your answer with actual integration | L5 | 8 | | CO4 |
| 10 | Evaluate with h=1/6 by (i) Trapezoidal rule (ii) Simpson’s one-third rule(iii)Actual integration | L5 | 8 | | CO4 |
| 11 | Evaluate using Trapezoidal and Simpson’s rule. With h=k=0.1 | L5 | 8 | | CO4 |
| 12 | Find the first & second, derivatives of f(x) at x=1.5 if   |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | | x | 1.5 | 2.0 | 2.5 | 3.0 | 3.5 | 4.0 | | F(x) | 3.375 | 7.000 | 13.625 | 24.000 | 38.875 | 59.000 | | L5 | 8 | | CO4 |
| 13 | By dividing the range into ten equal parts, evaluate by Simpson’s rule. Verify your answer with actual integration | L5 | 8 | | CO4 |
| 14 | Evaluate  by using (i) Trapezoidal rule (ii) Simpson’s one-third rule (iii)Actual integration | L5 | 8 | | CO4 |
| 15 | Evaluate using Trapezoidal and Simpson’s rule. Verify your result by actual integration | L5 | 8 | | CO4 |

**L1-Remember L2- Understand L3- Apply L4- Analyze L5- Evaluate L6- Create**

**CO3:** Appreciate the numerical techniques of interpolation in various intervals and apply the numerical techniques of differentiation and integration for engineering problems.

**CO4:** Understand the knowledge of various techniques and methods for solving first and second order ordinary differential equations.

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